



A casing approach to analyse connected changes in business networks

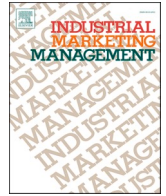
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A casing approach to analyse connected changes in business networks[☆]

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ABSTRACT

The paper addresses methodological challenges in conducting case studies of changes in business networks. Capturing change in business networks is difficult in case research since every change relates to many activities, resources, and actors that are subject to other changes. The aim is to develop a casing approach that supports researchers in capturing and determining which connected changes are analytically relevant to include in a case study and why. The approach is illustrated by a case study exploring how business actors address sustainability challenges by considering various changes of activities and resources. The approach suggests that a single case can be expanded by incorporating connected changes as embedded sub-cases, rather than ignoring them or treating them as background context. Furthermore, case boundaries are expanded during the research process, as data is continuously analysed. The approach shows how the distinction between context and causal contingencies can be elaborated and supports researchers in decisions related to this. A key implication is that aspects initially viewed as contextual may later be considered as contingent, and central to the case. The paper thus offers insights into how multiple changes co-evolve, helping researchers avoid simplistic explanations of why certain change initiatives succeed or fail.

1. Introduction

This paper deals with the methodological challenges involved in conducting case studies of changes in business networks. The casing approach that is discussed in the paper is exemplified by a case study that started as a study of a change initiative aiming at reducing excessive air in e-commerce parcels to make physical distribution more sustainable. In line with the notion of casing (Ragin, 1992) other connected changes in the unfolding context of the focal change initiative were identified during the study. Two alternative ways to continue the study were identified at this point. One option was to maintain the focus on the focal change initiative and let the other changes remain as part of the context. Another option was to address the connected changes as connected (sub-)cases in a single case setting. The latter was chosen for further exploration.

The paper, and the underlying study, is theoretically grounded in the Industrial Network Approach (also referred to as the IMP approach), and especially in the so-called ARA model, focusing on actors, resources, and activities in business networks (e.g. Håkansson, 1987; Håkansson &

Snehota, 1995). The notion of industrial, or business, networks, as connected business relationships was inspired by Social Exchange Theory where Cook and Emerson (1978) defined exchange networks as sets of two or more connected exchange relations. Considering change in relation to the structural notion of connectedness; i.e. connected business relationships and the content that connects them; makes connected changes challenging to capture in empirical studies. Halinen et al. (2012) discuss this challenge by pointing at one of the basic assumptions of business networks; that change is a result of interaction between actors, and thus that no actor can act independently from other actors which make “change and process [...] difficult to theorize and to depict.” (ibid.: 221).

The case study used as an example relates to how business actors address challenges involved in contributing to sustainability, or industry transformation, by considering various changes of their activities and resources. Hence, such changes are contemplated in contexts wherein there are numerous on-going changes of resource features and activities and that engage different sets of business actors. Although these notions are not exclusive to sustainability related changes, Harrison et al. (2023)

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point at three reasons why connectedness is vital for the understanding of sustainability changes in business networks. First; connectedness has a material character; i.e. the interaction taking place among actors in business relationships creates interdependencies in terms of activity links; resource ties; and actor bonds (Håkansson & Snehota, 1995). The substance of business relationships (ibid.) acts as ‘glue’ between actors. Second; the triad is the smallest unit of network analysis (Laage-Hellman, 1989); implying that what is happening in one business relationship is affected by and affects what is happening in directly and indirectly connected business relationships. Third; connectedness impact on network dynamics since changes are mediated in business networks i.e.; a change in one business relationship can affect changes in other business relationships (Harrison et al., 2023). Harrison et al. (2023: A12) emphasise connectedness as a key feature of sustainability transformation since it enables a focus on “*the systemic nature of sustainability challenges using a network lens*”. Hence; it is important for researchers to be able to capture changes and to analyse how these are connected to understand their impact on business networks. In view of the connectedness; a common challenge that industrial network researchers; and other open systems researchers; face is how to deal with the process of casing. Since connectedness is uncovered in the process; decisions on what to and what not to include have to be made in the process. As Ragin (2009: 523) remarked: “... empirical evidence is infinite in its complexity, specificity, and contextuality. Casing focuses attention on specific aspects of that infinity, highlighting some aspects as relevant and obscuring others.”

Hence, for researchers interested in understanding how changes impact business networks it is important to capture how changes are connected and the implications of such connectedness. Change in business networks is difficult to capture in case research since every change relates to a range of activities, resources and actors that may be subject to other changes. As pointed out above, this is methodologically challenging due to the inherent interdependencies in business networks. Against this backdrop, the aim of the paper is to address these methodological challenges by developing a casing approach that supports researchers in capturing and determining which connected changes are analytically relevant to include in a case study and why.

The outline of the paper is as follows. In the next section, change in business networks and how connected changes can be captured are discussed, as well as some reflections on critical realism as the underlying philosophy of science. In the following section, case research in business network studies is discussed. This is followed by a section where we provide a rationale for why this casing approach is needed in relation to earlier research on how change(s) have been addressed by case researchers. Furthermore, three research questions are presented. Thereafter, an example of how a casing approach was used to identify and analyse connected changes is discussed, followed by reflections on the casing process. The paper ends with a concluding discussion.

2. Capturing connected changes in business networks

Business network dynamics has been a core theme in IMP research for a long time. In one of the first papers addressing the matter, Mattsson and Johanson (1992) focused on how actors change their network positions over time. They concluded that the positions of actors are in constant change because of new business relationships being developed, and established business relationships being changed or dissolved. Furthermore, an actor's position can change because its direct and indirect counterparts change their positions. Since then, many scholars have contributed to the understanding of how change can be studied in business networks.

Time is a vital dimension of any study dealing with change and dynamics. Within IMP research, time has been addressed from different perspectives and with use of various concepts. For example, Hedaa and Törnroos (2008) highlighted concepts such as interaction processes; network change; network development and evolution; and exchange

episodes. A broad range of studies on change in business networks has taken a process view of dynamics (see e.g.; Aarikka-Stenroos et al., 2017). According to Halinen et al. (2012: 217–218); “*the focal process under study defines which actors; activities and resources in the network are of importance at each time*”. Furthermore; Halinen (1998) argued that what happens in a business relationship at a certain time is always a result of its past and future. Medlin (2004) developed these thoughts further; emphasising the role of the involved actors in the interaction processes and made a point of distinguishing between ‘interaction as exchange’ and ‘interaction as adaptation’. Some authors have focused on ‘events’; as for example Hedaa and Törnroos (2008) who proposed ‘events’ as a useful concept to analyse how business networks change over time. Furthermore; Medlin (2004) argued that managers will have overlapping views on the past; present and future; and consequently that “*there will be different views on what constitutes an event*” (ibid.: 191). Also; Chou and Zolkiewski (2012: 249) discussed events arguing that “*events are constituents of an interactive process in which they are organized by time*”.

Chou and Zolkiewski (2012: 257) identified “*five methodological considerations related to decoding network dynamics: network boundary; process; time; events; and conceptual tools for analyzing change*.” The authors highlighted the importance of defining the ‘network boundary’ to set the scope for the change; since the network; by definition; has no given boundary. Also; Halinen and Törnroos (2005: 1287) argued that “*the problem of network boundaries relates to the difficulty of separating the content and context of a business network*”. Holmen (2001), in turn, proposed the concept of ‘change boundary’ to define a change in relation to its context, i.e. separating what is inside the change boundary and what is outside based on the ramifications of a change. The notion of change boundaries can be used to distinguish which parts (e.g., resources, activities, actors) of a network that are affected by, and thus need to be considered, when studying a certain change. Apparently, these boundaries cannot be determined at the outset but have to be identified in the process of the study.

Hence, business network dynamics can be addressed by focusing on change in and of networks either by focusing on the process of change (e.g., Aarikka-Stenroos et al., 2017); or on how change(s) impact on the components (e.g. activities, resources, actors) and structure of the network (e.g.; Holmen, 2001). Changes in business networks; e.g. of resource features; do not occur spontaneously but require actions undertaken by actors. Interaction relates to stability and change; and seemingly minor changes can have major long-term impacts; even though it may not be clear at a specific point in time whether they are only minor adjustments or early signs of major change (Gadde & Mattsson, 1987; Håkansson & Waluszewski, 2013). Gadde and Håkansson (1992) highlighted that some changes will have a stabilising effect and that stability should not be regarded as the normal state; but as something actively created by actors. Hence; to understand changes in business relationships; these should be analysed within their ‘structural business network context’ (Gadde & Mattsson, 1987). Since business relationships are influenced by developments in other business relationships; changes of, for example, resource features, are affected by, and affect, other business relationships within the business network.

Methodological approaches to study change in business networks also differ in terms of how they relate to different ontological and epistemological standpoints. According to Andersen et al. (2023); the dominant research philosophy in a research community is often taken for granted; and within IMP research; researchers often rely on either a constructivist or a (critical) realist approach (Andersen et al., 2020a; Andersen et al., 2020b). The casing approach elaborated on in this paper relies on critical realism and thus assumes that there is a reality existing independently of our perceptions, interpretations, and theories about it (Easton, 2010; Holmen, 2001). For instance, resources such as machines have technical features that impact on how they can be used and combined with other resources such as the raw materials to be processed by them. However, critical realism recognizes that our understanding of

reality is shaped by our perspectives and experiences (Bhaskar, 2013). Hence; critical realism combines ontological realism; which acknowledges an objective reality; with epistemological relativism; which recognizes multiple perspectives in knowledge creation. According to Easton (2010), this enables researchers to investigate both observable events and underlying structures.

However, there can never be a perfect or complete understanding of reality, since all knowledge is historically and culturally situated. Studies relying on critical realism may uncover underlying structures and mechanisms with causal powers, as well as events that occur when causal powers are activated (Bhaskar, 2013; Holmen, 2001). Such causal mechanisms are the underlying forces or tendencies of entities that generate observable events or outcomes. These mechanisms are often not directly observable, but they are real and can be deduced through scientific study. Hence, entities possess causal powers, which are the abilities to act and liabilities which mean that they have predispositions. Furthermore, the outcomes of these causal mechanisms depend on how different mechanisms interact in an open system, e.g. a business network. This means that the underlying structures of, for example, a business network, are deep-level arrangements, or systems, within which these mechanisms operate. In the critical realist approach, context is often described as the social, cultural, institutional, and material conditions within which mechanisms operate, thus both enabling and constraining how mechanisms can be activated. Contingency on the other hand implies that mechanisms may or may not produce certain effects or outcomes depending on how they interact with other mechanisms in an open system, e.g. a business network, in which they operate. This implies that contingency reflects the unpredictability of outcomes of causal mechanisms, e.g. that a certain outcome is never guaranteed (Bhaskar, 2013).

According to Easton (2010), critical realism offers a robust framework that bridges the gap between empirical observations and theoretical explanations. Critical realism can enhance case study research by providing a nuanced way to interpret data, and advocate case study designs that allow researchers to delve deep into the context and mechanisms at play, moving beyond mere description to uncover causal relationships (ibid.). Furthermore, a critical realist case study approach is particularly well suited to relatively clearly bounded, but complex, phenomena such as organisations, inter-organisational relationships, or networks of connected organisations (ibid.).

The casing process refers to the application of case study research that is explicitly informed by the ontological and epistemological tenets of critical realism (Cabote et al., 2024). Casing in critical realism seeks not just to describe empirical phenomena but to understand and explain the underlying generative mechanisms and broader structures that produce events in the actual domain (ibid.). This is in accordance with Ragin (2009: 524) that argued: “*the realist perspective resonates strongly with the central idea that casing is a tentative and iterative process. The casing that inspires an investigation is always open to refinement and revision. By the time the research is complete; both the cases and their casing may have shifted substantially.*” This is in accordance with Eriksson and Engström (2021) who claim that research based on a critical realist approach should be seen as an iterative, continually interpretive and creative process of analysing data. Thus, researchers should justify intermediate results and stay open to what is not yet fully explained.

The current paper suggests an approach to study how changes are connected to understand how they influence each other through the actors, resources, and activities that are involved in, or affected by, them. An important aspect to consider when studying changes in business networks, as open inter-organisational systems, is how to deal with the context of the studied changes. Easton (2010: 121) discussed the distinction between context and contingency:

“The former offers a simpler, less well-articulated version of the latter. Context is simply “relevant circumstances”. It is a very general concept and says little about the relationship between the focal entities and the environment except that it is (possibly) relevant. In the case of critical realism the

entity should not only be defined but the form of the causal relationship clearly set out. The question should be “in what ways may the external contingency affect the events that have occurred?”

Hence, the distinction between context and contingency is important to consider in a case study of connected changes in a business network setting. By identifying other changes as relevant for the one(s) in focus of a study, connected changes – at first identified as part of the context of another change – may become subject to analysis in terms of their contingency, i.e.; *how they are connected.*

3. Case research in business network studies

Regardless of theoretical grounding, case research is considered a suitable method to capture dynamics in single settings (Eisenhardt, 1989; Yin, 2018). Furthermore, case studies have been the dominant research method in business market studies (Easton, 2010); and particularly in studies focusing on business networks (Dubois & Araujo, 2004). According to Halinen and Törnroos (2005: 1286) a case research strategy is suitable for studying business networks since it allows the study of a “*phenomenon; which is difficult to separate from its context; but necessary to study within it to understand the dynamics involved in the setting.*” Furthermore; according to Dubois and Araujo (2004: 210); the use of single case studies in business network research has been instrumental in capturing “*complex configurations of events and structures in concrete spatial and temporal contexts*”. Hence; single case studies provide opportunities to include vital aspects identified in the interplay between the case and its context during the process of making the case study; or ‘the casing’; as coined by Ragin (1992). Such casing processes allow reconsiderations of what the ‘case is a case of’ (ibid.). In line with that; arguing that reconsiderations; or ‘redirections’; are enabled by an abductive approach to case research; Dubois and Gadde (2002, 2014) stressed that interactions between the studied phenomenon and its context are best understood by in-depth case studies.

According to Welch et al. (2022); a main challenge for case researchers has been how to treat the case in relation to its context and that early advocates of case research; such as Eisenhardt (1989); took a rather positivistic approach to context. Welch et al. (2022) argue that Eisenhardt’s (1989) view on context was that the objective for the researcher was to identify patterns across cases that could hold for generalization. Hence; “*contextual detail is only relevant if it is generalizable; even though excluding contextual detail might lead to inadequate or even false conclusions being drawn about individual cases.*” (Welch et al., 2022: 6). Furthermore; pointing at the risks of decontextualising case research; they argue that this may lead to reductionism and causal misattribution and that it favours singular and linear causation. Decontextualization implies neglecting the meaning of social behaviour and the researchers’ own contexts and might produce irrelevant findings as well as inappropriate generalizations. To deal with these risks; Welch et al. (2022) suggest that case studies should aim for ‘contextualized explanations’ since this enables the context to be part of the explanation; and thus that the context itself has explanatory power. Worth noting is that recently; Eisenhardt (2021: 156) stressed the importance of ‘temporal context’, stating that she has become increasingly aware of “*the significance of temporal phenomena [...] and the many intriguing ways time unfolds*”. Hence, the role of context in case research in business studies is developing in a direction that lets context play a larger role in explanations and findings.

The context of changes relates to how and when case boundaries are set in case research. Halinen and Törnroos (2005) elaborated on the problem of boundary setting and argued that what “*forms the case network and what belongs to its context are fundamental questions to be answered in any case study project*” (ibid.: 1286). To handle this issue, they proposed different perspectives on case boundaries for business network studies. For example, an intranet perspective can enable study of different business units and firm-internal relationships within a large corporation, while a focal actor’s perspective takes one single actor as a

starting point to study other actors and their business relationships. Other suggested ways to deal with case boundaries are; a dyad-network perspective, which implies taking a focal dyad as the starting point and studying the two actors involved and related actors and business relationships, or a micronet-macronet perspective, starting from a focal net and the actors involved in this net and inquiring into how these relate to the actors and business relationships outside the focal net (ibid.). In case research based on interviews, the interviewees represent actors in the case and can provide input for researchers concerning the perception of actors on many levels. For example, a department or function in a firm can take decisions and have a standpoint (and knowledge) of something, for example a specific change.

4. A rationale for a casing approach to capture connected changes

Despite previous research on changes in business networks as well as how to methodologically approach such changes with case studies, there is little methodological guidance for researchers on how to capture connected changes in business networks. To analyse change in a certain business network setting, it is important to capture connections among changes to understand how changes influence each other through the actors, resources, and activities that are involved in, or affected by, the changes. Especially business network researchers interested in studying (connected) changes need guidance on how to define change boundaries, what should be considered context, and when and what connected changes should be brought into the case boundary resulting from relevant contingencies.

The paper elaborates on a case study approach drawing on the strengths of single case research wherein connected changes can be identified and analysed as embedded subunits, or sub-cases. Hence, Yin's (2018) notion of embedded sub-cases in single case studies; together with Ragin's (1992) notion of case studies as casing processes can be seen as starting points in this endeavour. A consequence of this is that in the suggested casing approach, the 'embedded sub-units' are identified successively in the casing process since they cannot be identified *ex ante*. The paper especially focuses on how researchers can address the challenges involved in a casing process to capture change in business network settings wherein multiple change initiatives and change processes are on-going. A main issue is to decide what is relevant and should be included in the case and what to be kept in its context. Hence, how a researcher decide what direction(s) to expand the case in is a key concern.

Based on this and the aim of the paper, the following research questions are identified:

RQ1: How can researchers determine which connections among changes can be considered analytically relevant?

RQ2: How can case boundaries expand during the casing process as new analytically relevant connected changes are identified?

RQ3: How can researchers distinguish between context and causal contingencies when studying connected changes in business networks?

5. Casing connected changes – an example

In this section a casing process is described that took its starting point in a study of a focal change initiative aiming at reducing excessive air (i. e. empty space) in e-commerce parcels to make distribution more sustainable. The study began in 2020, and as the study evolved we identified several other ongoing changes, that were connected to the focal change initiative since they in different ways impacted on the focal change, hence the efforts of reducing excessive air in e-commerce parcels. We therefore decided to include these changes in the case study. The casing process illustrates how connected changes can be captured in a business network and how the case boundary thus expands as a result of business actors pointing at connections to other changes.

Below, the focal change initiative is described, followed by a

description of how the study evolved as the data collection proceeded, which, in turn, led us to extend the study to include three connected changes. Thereafter, the boundaries of the connected changes are explored, along with how these changes were found to be connected. In addition, some of the implications of the connected changes for the business actors' actions (and reactions) are described.

5.1. The focal change initiative

In the beginning of the study, it appeared that excessive air in e-commerce parcels had created frustration among many business actors, e.g. logistics service providers, retailers, packaging suppliers, suppliers of packing automation, as well as consumers. During our discussions with some of these actors one rhetorical question was often posed: "*How hard can it be to pack e-commerce parcels with less excessive air...?*"

One of the major Swedish logistics service providers (henceforth referred to as LOG) was upgrading its facilities to handle increasing parcel volumes and to make better use of their facilities. In addition, they wanted to improve transport efficiency by reducing excessive air in parcels. Based on their estimations, e-commerce parcels in their logistics system typically contain at least 30% air. Therefore, in 2019, LOG started an initiative (henceforth referred to as the Packaging Initiative) where they worked together with some retailers to raise awareness about the need to reduce excessive air in parcels and to encourage knowledge sharing on retailers' e-commerce packing methods.

To further address the issue of excessive air, a research project was initiated together with LOG. At a kick-off for the Packaging Initiative in 2019 a representative of a packaging supplier (henceforth referred to as PACK) showed interest in joining the project. Furthermore, a retailer of home appliances (henceforth referred to as RET), a customer of both LOG and PACK, also became involved in the project. In the initial discussions it was clear that the representatives from the three firms shared the frustration concerning excessive air in e-commerce parcels.

5.2. Identifying connected changes

The data collection started by interviewing respondents suggested by the representatives of the three firms (LOG, RET, and PACK). As the study proceeded, various themes and issues emerged, which resulted in further investigations. In this process, other changes, directly and indirectly connected to the focal change initiative, were identified. A key question became whether to stay focused on the focal change initiative and thus regard the other changes as part of the context, or to incorporate these connected changes in the case study. Eventually, we decided to let the case study expand to incorporate other relevant changes, examining their contexts, and inquiring into how these changes were connected and the effects of these connections.

In 2022, when the project ended, 31 representatives from different functions of the three main firms had been interviewed. In addition, 18 representatives from 15 other firms, including retailers, packaging suppliers, and packing automation suppliers, had been interviewed. These interviews provided insights into the focal change initiative as well as into the connected changes and how they were connected. The interviews were recorded, transcribed, and analysed. In the next section, issues brought up in some of the interviews are used as examples to highlight how the connected changes were identified and analysed during the casing process.

5.3. The casing process

Table 1 presents an overview of the interviews that led to identification of the connected changes and the sequence of these interviews. Beyond these nine interviews, other interviews added to the knowledge about the different connected changes as well as how they were connected. This table will be referred to throughout Section 5.3 as a basis for describing and analysing the casing process.

Table 1

Overview of the interviews that led to identification of the connected changes and their sequence.

Interview sequence	Interviewed firm	Interviewee(s)'s title
1	PACK	Design Manager and Sales Manager
2	LOG	Claims Manager
3	LOG	Project Manager and Process Manager
4	RET	Procurement Manager
5	PACK	Compliance Manager
6	RET	Sustainability Specialist
7	RET	Packaging Manager
8	RET	Process Developer and Mechanical Engineer
9	LOG	Packaging Consultant

Already in the first interview with the Design Manager and the Sales Manager at PACK (1), e-commerce parcels were discussed in a wider packaging context. The interviewees described the challenges faced by retailers in handling e-commerce distribution in parallel with distribution to physical stores. This is due to that product packaging is primarily designed for display in physical stores, which also influences the development of e-commerce packaging solutions. The interviewees brought to the fore that the issue of excessive air in e-commerce parcels might not solely be related to how retailers perform e-commerce packing, but also to the design of the product packaging. This was considered interesting but nevertheless we proceeded with interviews suggested by the representatives of the three main firms, keeping the focus on the focal change - reducing excessive air in retailers' e-commerce packing operations.

In an interview with the Claims Manager at LOG (2), the interviewee emphasised the need for durable packaging that can withstand rough automated handling in their sorting operations. The interviewee explained how parcels are tipped onto the conveyor belt, both manually and automatically, and therefore must be robust enough to withstand this drop. This was also observed first-hand during a study visit at LOG's facility. In a later interview, a Packaging Consultant at LOG (9) explained that the sorting operation imposes requirements not only on protection but also on parcel design – such as minimum size and weight - to ensure that parcels stay on the conveyor belt and to provide adequate space for labels. Although interviewees at LOG mainly focused on encouraging retailers to adapt to LOG's packaging requirements, the interviews and the study visit highlighted that retailers were not the only ones who would need to adapt. Changes of other resources and resource interfaces across the business network would also be necessary to reduce excessive air in e-commerce parcels. To explore LOG's operations further, an interview with the company's Project Manager and Process Manager, as suggested by the project representative, was conducted.

In an interview with LOG's Project Manager and Process Manager (3), the interviewees pointed to a review by the [Swedish Work Environment Authority \(2022\)](#), which had raised concerns about outdated practices and unsafe working conditions in the e-commerce industry. In response, they explained that LOG had initiated a project to improve parcel handling processes to comply with updated work environment regulations. At the time, work environment issues were not considered central to the study. However, the interview made it clear that, to handle risks associated with manual handling of parcels, LOG was considering increased automation in sorting of parcels to reduce physical strain on staff. In earlier interviews, it had also been pointed to that an increase in automation at LOG might increase the need for protection of parcels (i.e. stricter packaging requirements), which, in turn, could result in a need to increase the air in e-commerce parcels. These insights pointed to a need to further examine RET's packing processes and their adaptations to stricter packaging requirements.

In an interview with RET's Procurement Manager (4), investments in

packing automation were discussed. The interviewee noted: “*With the shift to automation in the central warehouse, our use of cartons for manual packing will decrease*”. The interviewee explained that this would probably reduce the ability to fit different orders with available box sizes, resulting in more excessive air in parcels. The interviewee also stated that “*changes in the logistics service providers' packaging requirements, cost models, and work methods affect us and thereby also our packaging supplier.*” The interview added to the insight that automation at different stages of distribution (e.g. parcel sorting at LOG and packing automation at RET) imposes different packaging requirements and creates outcomes that affect the initial initiative of reducing excessive air in e-commerce parcels. This initiated a later interview with RET's Process Developer and Mechanical Engineer involved in implementing packing automation.

In the interview with the Compliance Manager at PACK (5) their role in assisting customers with regulation compliance was highlighted. The interviewee pointed to the European Commission's proposal, aiming to reduce waste and excess packaging and ensuring that packaging is reusable or recyclable by 2030 ([European Parliament, 2023](#)). The interviewee emphasised PACK's aim to replace plastic with cardboard and that this concern was shared with many retailers. This led us to inquire into how such regulations may influence excessive air in e-commerce parcels. In a later interview, RET's Sustainability Specialist (6) noted that replacing plastic with paper in packaging improves recyclability and customer experience, but leads to challenges such as reduced transport efficiency, as paper packaging occupies more space. Taken together, these inputs made us inquire further into how excessive air is also a consequence of other changes to make the packaging system more sustainable.

Based on the first interview with PACK's Design Manager and Sales Manager, the impact of product packaging on e-commerce packaging became apparent to us. The interview with RET's Packaging Manager (7) added to this understanding, describing how RET's product packaging is designed to promote visualisation and sales in physical stores. The interviewee also explained that ongoing sustainability changes, in line with those described in interview 6, primarily aim to replace plastic with paper in product packaging. The interviewee also pointed to that established product development routines pay limited attention to e-commerce requirements on product packaging. This, in turn, made us understand how these sustainability changes and routines create downstream inefficiencies, including excessive air, in e-commerce parcel packing and handling.

To get a more thorough understanding of the packing automation at RET, we interviewed a Process Developer and a Mechanical Engineer (8) involved in the implementation. The interviewees explained that RET had installed four packing machines, each with a different box footprint (i.e. 'bottom size'). The Process Developer noted that RET's automated packing, limited to standard box sizes, often resulted in larger parcels and thus in more excessive air compared to the flexibility and tighter packing that could be achieved through skilled manual packing. The Process Developer also indicated that RET seeks to balance the cost benefits of automated packing – despite the risk for more excessive air - against the higher costs of manual packing. Together with the earlier interview with RET's Procurement Manager, this added to the understanding of how packing automation impact on the amount of excessive air in e-commerce parcels.

5.4. Case boundaries of the connected changes

We initially framed the case around the focal change initiative (henceforth referred to as Change initiative A): reducing excessive air in e-commerce parcels. As the casing proceeded, interviews revealed divergent views about which changes were significant and how they were connected. Interviewees at LOG framed the issue in terms of work environment obligations and sorting operations, arguing that increased automation entails rougher handling and therefore requires more

robust, often standardised, parcels. RET emphasised its newly implemented e-commerce packing automation, noting that fixed box footprints reduce the ‘fitting flexibility’, in turn resulting in increased excessive air in parcels. Both RET and PACK pointed to shifts in packaging materials, while also highlighting how store-oriented packaging creates inefficiencies for e-commerce packing and distribution. In addition, other changes were mentioned by the 49 interviewees included in the study, such as how the introduction of training programmes for manual packing personnel influences the amount of excessive air, and how a new brand manual shapes product packaging in ways that make it less suitable for e-commerce. These changes were initially investigated by us but were ultimately treated as part of the context (i.e. outside the case boundary), as the involved interviewees considered these to have only minor impact on excessive air in parcels compared with the three changes that were included within the case boundary.

Consequently, we decided to expand the case boundary beyond Change A to include three connected changes - Change B: introducing automation in e-commerce packing, Change C: changing packaging materials, and Change D: increasing automation in sorting of parcels. Together, these changes and the ways in which they are connected reveal both technical challenges and different actor perspectives on how to deal with them. The following sections describe the focal change initiative and the three connected changes, based on how these were identified and analysed by us.

5.5. Change initiative A: reducing excessive air in e-commerce parcels

At the beginning of the research project, LOG, PACK, and RET seemed aligned regarding the importance of achieving the goals of Change initiative A. However, as we began collecting data, interviewees from the three firms pointed to other changes affecting the focal change initiative.

5.6. Change B: introducing automation in e-commerce packing

As a result of the interviews, it became clear to us that the amount of excessive air in e-commerce parcels depended on how packing was carried out (as described by RET's Process Developer, Mechanical Engineer and Procurement Manager). RET was automating e-commerce packing to manage increasing e-commerce volumes, but items with ‘odd’ sizes and delicate products were still packed manually. According to RET's Process Developer, automation prioritises speed over flexibility, limiting the ability to match product sizes with parcels. We also observed that standardised automated packing operations made adaptations to logistics service providers' packaging requirements and changing assortments more difficult. Additionally, RET's Procurement Manager explained that the increased use of automation had led to a re-evaluation of the assortment of carton sizes for manual packing, resulting in a narrower assortment of parcels and potentially a poorer fit between parcels and ordered products, leading to more excessive air also in manual packing. Thus, while automation was essential for RET to keep up with the growth in e-commerce, it limited the precision of manual packing and constrained the adaptability in automated packing.

5.7. Change C: changing packaging materials

The Compliance Manager at PACK explained that they were assisting customers in complying with current packaging regulations and preparing for upcoming ones that stipulate that all packaging should be reusable or recyclable by 2030. PACK promoted the use of cardboard for e-commerce packaging. Meanwhile, RET was aiming to make all their products, including packaging, more environmentally sustainable. Aligning with recyclability regulations, this led to changes to reduce the use of plastic, but this could also result in less space-efficient packaging. We noted that the lower flexibility following from the use of paper and

cardboard could result in larger e-commerce parcels overall, which would not contribute to reducing air in parcels. Based on inputs from PACK and RET, we also observed that the shift from plastic to paper and cardboard was broadly applied, including both product packaging and e-commerce packaging, both of which had implications for the amount of excessive air in e-commerce parcels.

5.8. Change D: increasing automation in sorting of parcels

RET's Procurement Manager, as well as LOG's Claims Manager and Packaging Consultant, emphasised that LOG's packaging requirements (e.g., size, form, weight) impose strict specifications for retailers like RET. In response to the review of the working conditions in the e-commerce industry, LOG launched a project to comply with regulations and to mitigate risks in parcel handling. As the Project Manager at LOG noted, increasing automation, particularly in the loading and unloading in sorting of parcels, is key to improving employee safety. However, we observed that the current automated system of tipping parcels onto conveyor belts had been identified by RET as a main factor necessitating extra protective packaging, leading to the use of additional filling material and consequently, more excessive air in parcels.

5.9. The four changes and their connections

The casing process began with the focal change initiative (Change initiative A) to reduce excessive air in e-commerce parcels, initiated by LOG to improve efficiency and effectiveness of its facilities and to improve transport efficiency. Introducing automation in e-commerce packing (Change B) was seen as a solution for retailers; however, some interviewees indicated that the speed of packing was prioritised over reducing excessive air. (See Fig. 1, Change A ↔ Change B).

In parallel, packaging materials were changing (Change C), often from plastic to cardboard, for both e-commerce packaging and product packaging. The interviewees explained that these changes were mainly driven by regulations, and that the choice of packaging material was connected to both Change A and Change B. As both the development of product packaging and automation solutions for e-commerce packing (Change B) shifted towards the use of paper and cardboard, excessive air in e-commerce parcels tended to increase, thereby impacting on the focal change initiative. (See Fig. 1, Change A ↔ Change C ↔ Change B).

Several interviewees also highlighted LOG's packaging requirements as a key factor influencing e-commerce packaging decisions. At the same time, LOG aimed to increase the use of automation for tipping parcels onto conveyor belts in their sorting facilities (Change D) to improve the working environment. However, this may impose stricter packaging requirements and a greater need for protective packaging material, potentially leading to more excessive air in e-commerce parcels. (See Fig. 1, Change A ↔ Change D ↔ Change B).

In Fig. 1 the four identified changes are illustrated together with how they were found to be connected based on interviews with representatives from different functions of the firms, who had insights into various resource adaptations and activity adjustments.

The connections among the changes, through their impact on resources and resource interfaces, entailed that the impact of one change could not be isolated from that of other changes. Therefore, to capture the connections among the identified changes the analysis had to go beyond the individual changes and the actors involved in each. Moreover, from the initial focus on the three key business actors' roles and positions in the network, the firm-internal functions' perspectives, outlined by the firm representatives, added to the resource-level analysis. The interviewees representing the various company functions hence influenced the choices on how to proceed with the casing process, both to uncover more details on each change, but also to scrutinise how they were connected. In this way, the analysis traced causally connected changes of resources and resource interfaces and explored how they were connected to the initial change initiative and with each other, see Table 2.

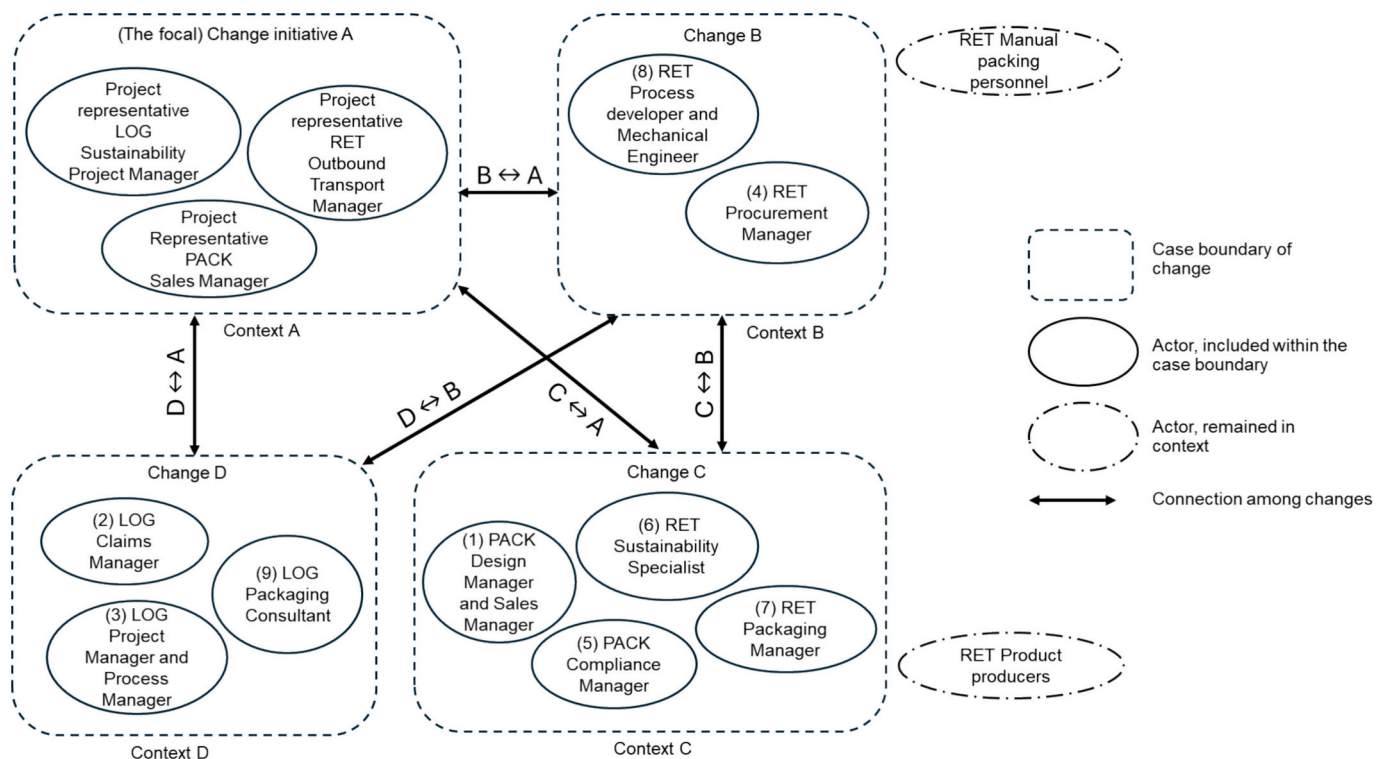


Fig. 1. Interviewees from the main actors involved in the four connected changes and the interviews (numbered) identifying the connections.

6. Reflections on the casing process

In the following section, the casing process is reflected upon in general terms (see Fig. 2). The case study took its starting point in a particular change initiative, here labelled the focal change initiative. When exploring what this change initiative would imply in terms of resource adaptations and/or activity adjustments in the underlying network structure, other changes (1, 2, 3...n) were identified as relevant since these were in different ways also impacting on the resources and/or activities in focus. The casing process therefore led us to bring these changes into the case study as connected sub-cases in the (expanding) single case setting. Hence, these connected changes were no longer considered as part of the context but as contingent. In this case, the causal contingency relied on the resource interfaces and the features of the resources in relation to various other resources and their uses (activities) in the underlying network structure.

The changes were identified by us in the casing process based on (1) how they were perceived by the actors involved, i.e. by the ones taking decisions on how to act (or react) on the changes, and (2) on interviewees' explanations of how the changes would impact on resources and activities, and with what actors they would need to interact in relation to each change. Each change could thus be defined by its change boundary in terms of how the change was, or may become, 'embedded' in (parts of) the underlying network structure.

We were methodologically challenged by how the connected changes could be incorporated in the case study. In this case study, the expansion of the scope of the case followed from identification of technical resource features in the underlying network structure and the actors' perspectives on relevant connections, and thus their perspectives on how other changes would impact on their actions. If we had maintained the focus only on the focal change initiative, the other changes might have been considered as either disturbing it, or facilitating it, and thereby remained as part of the focal change initiative's context. By addressing each change as an embedded sub-case, the change boundary (Holmen, 2001) of each change could be analysed together with how

these change boundaries related based on their impact on key resources and activities of importance for the actors involved. The analysis addressed several levels of analysis: (1) the network level involving all identified changes, (2) the individual changes and their (actual or potential) influence on each other, and (3) the individual resources and activities subject to change(s).

In view of the boundary issues discussed by Halinen and Törnroos (2005); the suggested casing approach relates to their suggestion of applying a 'micronet-macronet perspective'. In this paper; the case study began with a focal change initiative and the actors involved in it (micronet); and then; based on these actors' perspectives; we identified connected changes and the (additional) actors involved in them (macronet). Another aspect concerns what the case is; or may become; a case of (Ragin, 1992). Starting as a case of a sustainability initiative in e-commerce packaging the case evolved into other areas. That is; what the case was a case of was reconsidered because of the choices made by us regarding the relation between the case and its context. The casing approach entailed extensions based on the identified connected changes and the perspectives of the actors involved in them. The case study thus took a starting point in what could be considered as 'an arbitrary centre' (Dubois & Araujo, 2004); i.e. the focal change initiative. In line with Ragin's (2009): 523 observation that "empirical evidence is infinite in its complexity, specificity, and contextuality" and that casing highlights "some aspects as relevant and obscuring others", the evolving case boundary was shaped by the actors involved in this initiative. The actors' perspectives initially guided which parts of the business network, and which connected changes, were considered relevant and therefore included within the case boundary.

The focal change initiative subject to scrutiny was introduced at a point in time when several (later identified as connected) changes were on-going, and co-evolving, which made these changes surface as they were, in different ways, conflicting with or in other ways impacting on the focal one through on-going or contemplated resource adaptations and/or activity adjustments. Therefore, the initial aim; to address a particular change initiative to make packaging more sustainable,

Table 2

Summary of the connections among the identified changes (see A, B, C, D in Fig. 1), the key resource interfaces involved, and their impact on resources and activities.

Connections among identified changes	Key resource interfaces involved	Resource and activity impact
Introducing automation in e-commerce packing B ↔ A Reducing excessive air in e-commerce parcels	Packing automation facilities–Parcels Carton assortment in manual packaging–Parcels	Increasing the speed of packing, resulting in less ‘fitting flexibility’ (and thus more air) Reducing manual packing, resulting in less carton sizes (and thus more air)
Changing packaging materials C ↔ A Reducing excessive air in e-commerce parcels	Packaging materials–Parcels Packaging materials–Product Packaging–(E-commerce) Parcels	More sustainable packing materials, changing from plastics to paper and cardboard for both E-commerce Parcels and Product Packaging, resulting in less flexible and more bulky packaging (and thus more air)
Increasing automation in sorting of parcels D ↔ A Reducing excessive air in e-commerce parcels	Sorting facilities–Parcels	More robust packing (and thus more air) required
Changing packaging materials C ↔ B Introducing automation in e-commerce packing	Packaging materials–Packing facilities–Parcels Packaging materials–Product Packaging–Packing facilities–Parcels	More sustainable packing materials, which means that packing automation favours cardboard (even though plastic could result in less air in parcels)
Increasing automation in sorting of parcels D ↔ B Introducing automation in e-commerce packing	Sorting facilities–Parcels–Packing facilities	More robust packing (and thus more air) required (while existing packing automation makes it difficult to quickly adapt to new packaging requirements, creating a mismatch)

evolved into understanding the actors' perspectives on a set of connected changes – not all concerned with sustainability. Hence, the changes identified as being of relevance for the actors involved could not be generalised as ‘joint sustainability changes’, since they were influencing and influenced by other changes in different ways. New policies and regulations were important external drivers – as parts of the context - to some of the changes. Consequently, one type of contribution of a study of connected changes can be to explain how specific changes, as consequences of individual (in the views of policy makers) policies and regulations, become combined at the firm, relationship, and network levels of analysis.

7. Concluding discussion

The aim of the paper has been to develop a casing approach that supports researchers in capturing and determining which connected changes are analytically relevant to include in a case study and why. Case researchers working on case studies of business network phenomena often identify an abundance of connections (in general terms) inspired by their conceptual frameworks. The challenge lies in determining which connections to include in the case study and how to analyse them - decisions that involve both theoretical and empirical considerations.

The paper has focused on connections among changes in business networks and addressed three research questions: (RQ1) How can researchers determine which connections among changes can be considered analytically relevant?; (RQ2) How can case boundaries expand during the casing process as new analytically relevant connected changes are identified?; (RQ3) How can researchers distinguish between context and causal contingencies when studying connected changes in business networks? These research questions have been elaborated in terms of how to distinguish between causal contingencies and context, and in terms of identifying and analysing connected changes based on how these changes impact on underlying network structures, such as the activities, resources and actors, and the causal mechanisms operating in these structures.

When researching change in business networks the suggested casing approach may resolve some of the issues of concern with contextualising case research (Welch et al., 2022) and of reducing the risks of simplifying ‘causation of change’ (Pettigrew, 1990) since it allows making sense of how changes are connected. Returning to the question initially raised by the actors involved in our case; “*How hard can it be [to make this change]?*”, the answer is that it depends, but also why and how it depends on other on-going changes based on interdependencies among resources and activities as well as on different actors' perspectives that

may not be recognised until a change is contemplated. By maintaining a focus on a particular change and considering other changes - impacting on some part(s) of the same underlying structure -, as context, the outcomes would risk becoming interpreted as failures, or as if one or several actors were generally trying to avoid change.

Deciding on how to expand a single case study by adding sub-cases of connected changes is not simply a matter of ‘selection’ made by the researchers but relies on a growing understanding and articulation of causal contingencies operating in the underlying structures. Such understanding develops through interaction with relevant business actors when capturing their views on whether potential connections are relevant or not. Herein, the critical realist notion of combining ontological realism with epistemological relativism seems vital. The many ‘real’ technical features and interfaces that can be observed and described when studying change in business networks also need to be analysed in view of how the actors involved perceive them. The interviews carried out in case studies can thus contribute both ‘real’ and ‘relative’ aspects of changes and their connections. Moreover, some of the interviews may point to a need to expand the case boundary to include other relevant changes based on how these impact the change in focus through interdependencies in the underlying network structures. Hence, the choices made regarding context and contingency in the scrutiny of connected changes relate to identifying causal mechanisms in these underlying structures. By analysing how changes are related through such underlying structures, an understanding of both the individual changes – and their respective boundaries - and the mechanisms operating in the underlying structures can be developed. What is to be considered as contingent and contextual when starting to study a particular change thus needs to remain open, and to be continuously revisited, when the case is expanded by inclusion of relevant connected changes. Hence, although the starting point, i.e. the choice of studying a certain change, might be seen as arbitrary, the connections to other changes are not.

The paper contributes a novel casing approach proposing how a single case can be expanded by incorporating connected changes as embedded sub-cases, rather than ignoring them or treating them as background context. Similar to other suggestions of casing processes, the casing approach suggests that case boundaries are expanded during the research process, as the data is continuously analysed, guided by identification of resource adaptations, activity adjustments, and business actors' perceptions on what and how connections are relevant. In addition, the paper contributes suggestions on how the distinction between context and causal contingencies can be elaborated in the case research process. Connected changes are to be considered contingent rather than contextual when they affect the same ‘components’ in underlying

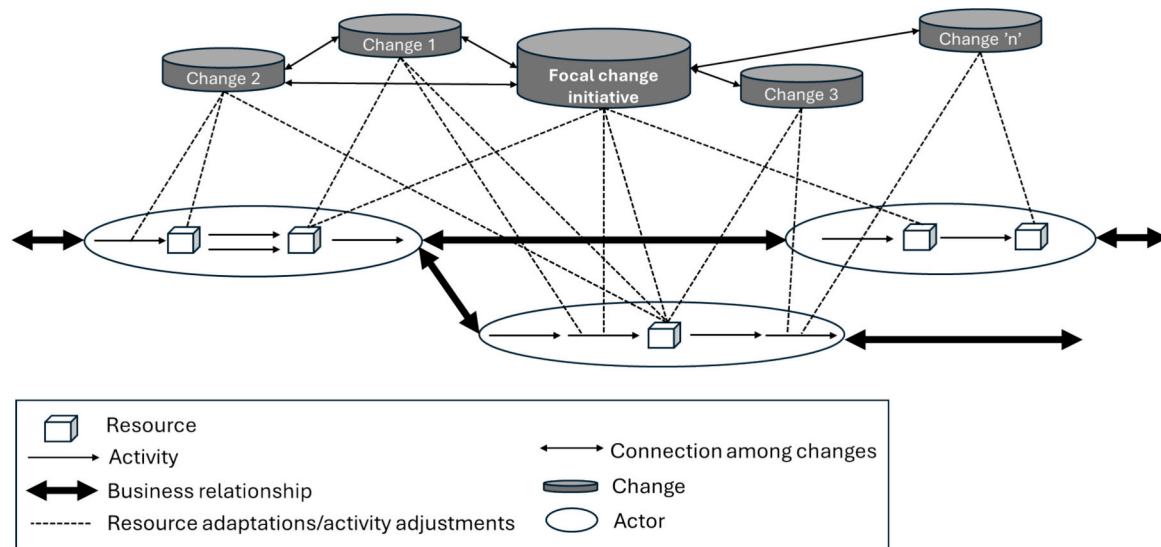


Fig. 2. Casing of ‘n’ connected changes and how these relate to the underlying network structure consisting of actors, resources, and activities.

network structures. Hence, it supports researchers in deciding what should be included within the case boundary and what should be described as contextual. An important implication of this is that what is perceived as contextual at one point in time can be considered as contingent, and within the scope of the case, at a later point in time. For the researcher it is important to actively search for contingencies during the data analysis. Going back to previously collected data might lead to other conclusions about a certain change, or its connections with other changes, at a later stage in the research process.

In addition, rather than analysing a focal change in isolation, the paper suggests ‘connected changes’ as an appropriate unit of analysis when addressing change in business networks. Drawing on the Industrial Network Approach (e.g., Håkansson & Snehota, 1995), three levels of analysis are suggested: (1) the network level involving all identified changes, (2) the individual changes and their (actual or potential) influence on each other, and (3) the individual resources and activities subject to change(s). This, in turn, supports description and understanding of how multiple changes co-evolve and affect each other, and thus helps to avoid simplistic explanations of why certain change initiatives succeed or fail.

CRedit authorship contribution statement

Sandra Brüel Grönberg: Writing – original draft, Visualization, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Anna Dubois:** Writing – original draft, Visualization, Methodology, Formal analysis, Conceptualization. **Kajsa Hulthén:** Writing – original draft, Visualization, Methodology, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Ann-Charlott Pedersen:** Writing – original draft, Visualization, Methodology, Formal analysis, Conceptualization.

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